

What is claimed is:

1. A sample solution measuring device for detecting dissolved substances in a sample solution by measuring a potential difference between the sample  
5 solution and a reference solution, the sample solution measuring device, comprising:

a sample solution container;

a reference solution container;

a substrate thin film located between the sample solution container  
10 and the reference solution container and having a hole in which a bilayer lipid membrane is formed, where the sample solution and the reference solution come into contact with each other;

a mechanism which forms the bilayer lipid membrane by ejecting a lipid solution; and,

15 a mechanism which ejects a cleaning fluid to the substrate thin film .

2. The sample solution measuring device of claim 1, wherein a temperature of the cleaning fluid upon arrival at the substrate thin film is a melting temperature of the lipid or more.

20 3. The sample solution measuring device of claim 1, wherein water levels of the sample solution and the reference solution are positioned lower than the hole when the cleaning fluid is ejected to the substrate thin film.

25 4. The sample solution measuring device of claim 1, wherein the mechanism which ejects the cleaning fluid to the substrate thin film, is a

cleaning nozzle which ejects a cleaning fluid by a jet stream.

5. A sample solution measuring device for detecting dissolved substances in a sample solution by measuring a potential difference between the sample solution and a reference solution, the sample solution measuring device, comprising:

a sample solution container;

a reference solution container;

a substrate thin film located between the sample solution container and the reference solution container and having a hole in which a bilayer lipid membrane is formed, where the sample solution and the reference solution come into contact with each other;

a mechanism which forms the bilayer lipid membrane by ejecting a lipid solution; and,

a mechanism which heats the hole to a melting temperature of the lipid or more, the mechanism being provided on the substrate thin film.

6. The sample solution measuring device of claim 5, wherein the mechanism which heats the hole to the melting temperature of the lipid or more is provided on the substrate thin film, is a thin-film heater attached to the substrate thin film.

7. A sample solution measuring device for detecting dissolved substances in a sample solution by measuring a potential difference between the sample solution and a reference solution, the sample solution measuring device, comprising:

a sample solution container;

a reference solution container;

a substrate thin film located between the sample solution container and the reference solution container and having a hole in which a bilayer lipid membrane is formed, where the sample solution and the reference solution come into contact with each other;

a mechanism which forms the bilayer lipid membrane by ejecting a lipid solution; and,

a mechanism which vibrates the hole being provided on the substrate thin film.

8. The sample solution measuring device of claim 7, wherein the mechanism which vibrates the hole is provided on the substrate thin film, is a thin-film vibrator attached to the substrate thin film.

9. A sample solution measuring device for detecting dissolved substances in a sample solution by measuring a potential difference between the sample solution and a reference solution, the sample solution measuring device, comprising:

a sample solution container;

a reference solution container;

a substrate thin film located between the sample solution container and the reference solution container and having a hole in which a bilayer lipid membrane is formed, where the sample solution and the reference solution come into contact with each other;

a mechanism which forms the bilayer lipid membrane by ejecting a

lipid solution; and,

a mechanism which heats the sample solution and the reference solution to a melting temperature of the lipid or more.

5 10. The sample solution measuring device of claim 9, wherein the mechanism which heats the sample solution and the reference solution to the melting temperature of the lipid or more, is a thin-film heater attached to the substrate thin film.

10 11. The sample solution measuring device of claim 9, wherein the mechanism which heats the sample solution and the reference solution to the melting temperature of the lipid or more, is a heater provided in any of a sample solution inlet, a reference solution inlet, the sample solution container and the reference solution container.

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12. A sample solution measuring device for detecting dissolved substances in a sample solution by measuring a potential difference between the sample solution and a reference solution, the sample solution measuring device, comprising:

20 a sample solution container;

a reference solution container;

a substrate thin film located between the sample solution container and the reference solution container and having a hole in which a bilayer lipid membrane is formed, where the sample solution and the reference  
25 solution come into contact with each other;

a mechanism which forms the bilayer lipid membrane by ejecting a

lipid solution; and,

a mechanism which stirs any of the sample solution and the reference solution.

- 5    13.    The sample solution measuring device of claim 12, wherein the mechanism which stirs any of the sample solution and the reference solution is a stirrer provided in any of the sample solution container and the reference solution container.